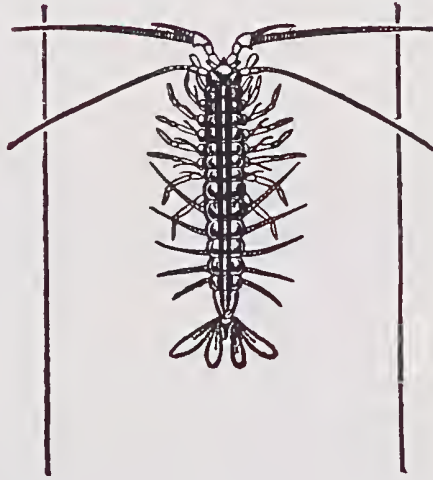


RECORDS OF THE
QUEEN VICTORIA MUSEUM
LAUNCESTON



Edited by
C. B. TASSELL
Director of the Museum



DESCRIPTION OF THREE TASMANIAN CHAROPID GENERA (PULMONATA: MOLLUSCA) WITH NOTES ON THEIR TYPE SPECIES

Brian J. Smith
Senior Curator (Zoology), Museum of Victoria

Ron C. Kershaw
Honorary Research Associate, Queen Victoria Museum and Art Gallery

Manuscript received 5/9/84

Published 1/1/85

The three Charopid genera *Mulathena*, *Stenacapha* and *Thryasona* proposed by Iredale in 1933 are declared *nomen nuda* due to lack of any description. These genera are described and details given of the radula and reproductive anatomy of the type species as well as their synonymy and distribution. The type species of *Mulathena* is *Helix (Hemiplecta) fordei* Brazier, 1871; of *Stenacapha* is *Helix hamiltoni* Cox, 1868; and of *Thryasona* is *Helix diemenensis* Cox, 1868.

INTRODUCTION

Iredale (1933) published a series of systematic notes on the Australian land snail fauna in which he erected over 80 new genera and subgenera, together with many new species, subspecies and new combinations. As this was only a 22 page paper with no figures, most of these new names were given very brief diagnoses, a fact that has drawn severe criticism (Solem, 1959, 1964). Many of the genera described in this paper have been considered *nomen nuda* because the diagnoses were so brief that they failed to differentiate the new taxa or were entirely lacking in any description. Most of these genera have been adequately described in subsequent papers, either by Iredale himself (1937c, 1939) or by later workers (Kershaw, 1956; Solem, 1964). But there are still a few generic names that were inadequately diagnosed in 1933 and therefore considered *nomen nuda* that have never been redescribed.

In particular three charopid generic groups of species found in Tasmania and southern Victoria, *Mulathena*, *Stenacapha* and *Thryasona* as hitherto recognised, fall into this category.

Iredale's "original descriptions" (1933) of these 'genera' are as follows:-

(p. 53) "Another species regarded by May as *Flammulina* was the *Helix fordei* Brazier, which Suter had referred to *Thalassohelix*; the Tasmanian shell is made the type of the genus *Mulathena*."

(p. 53) "The Tasmanian *Helix savesi* Petterd was regarded as *Phacussa* by Suter, but relegated to *Flammulina* by May, with which genus it cannot be associated, so that *Stenacapha* is here added for it."

(p. 54) "The Tasmanian *diemenensis* Cox recalls the Rhytidoid series and little resembles true *Flammulina*, under which it was placed by May, so that the new generic name *Thryasona* is introduced for it."

At the end of the paper he lists the new names and type species as follows:-

Mulathena gen. nov.: type *Helix fordei* Brazier.

Stenacapha gen. nov.: type *Helix savesi* Petterd.

Thryasona gen. nov.: type *Helix diemenensis* Cox.

It is considered that these names be *nomen nuda*, and therefore are not taxonomically available. The purpose of this paper is to validate these three names by describing the generic groups to which they apply. Iredale's names are preserved because they are well known in the literature and it is possible to demonstrate that the groups to which they have been applied are recognisable generic entities.

Also provided is evidence that these groups are clearly charopid. But the inter-relationships are complex and will require much more extensive study.

Mulathena gen. nov.

Mulathena Iredale, 1933. *Rec. Aust. Mus.* 19, 53 (*nomen nudum*).

Diagnosis: Shell thin, medium, up to 5 whorls with expanding coils, turbinate to conoid with elevated spire, acute apex and wide deep body whorl, periphery keeled and sutures grooved. Umbilicus minute, aperture oblique ovate-lunate. Sculpture of fine, spaced radial ribs and riblets to rugose, protoconch of radial lirae to smooth. Colour horn to brown. Penis large with vas deferens inserted terminally, no epiphallus. Radula about 40-48 teeth per row, central the same size as the adjacent lateral teeth, laterals tricuspid, marginals unicuspid, lanceolate.

Type species: *Helix (Hemiplecta) fordei* Brazier, 1871.

Remarks: The genus is characterised by the thin, turbinate shell with the elevated spire and minute umbilicus, with a sculpture of radial ribs, protoconch of radial lirae and no flames of colour. The only Australian genus with which this could be confused superficially is *Flammulops* Iredale, 1937 which also has a thin turbinate shell. However, *Flammulops* differs in having a closed umbilicus, sculpture of close riblets, a protoconch with spiral striae and brown colour flames on the shell.

Mulathena also appears close to the New Zealand genus *Flammulina* but is separated by the high spire and by the marginal teeth being unicuspid instead of multicuspid as in *Flammulina* (Powell, 1979). Like *Flammulina*, *Mulathena* is without an epiphallus and the lateral teeth of the radula are very similar.

Mulathena is found throughout Tasmania and in the southern central part of Victoria. It is absent from the Otway Ranges of Victoria (Smith, 1977) and is not sympatric with *Flammulops*. It is found in wet forest where it can be seen crawling on logs or low plants in wet conditions (Plate 1).

Mulathena fordei (Brazier, 1871)
(Plate 2A, Plate 3A)

- Helix* (*Hemiplecta*) *fordei* Brazier, 1871. *Proc. Zool. Soc. Lond.* 1870, 662.
Helix (*Planispira*) *allporti* Legrand, 1871. *Coll. Mon. Tas. Land shells* 1st edition sp. 18.
Helix petterdi Legrand, 1871. *ibid.* sp. 18. (*nomen nudum*).
Helix (*Camaena*) *medianus* Legrand, 1871. *ibid.* sp. 19.
Helix (*Charopa*) *helice* Legrand, 1871. *ibid.* sp. 20.
Helix (*Planispira*) *austrinus* Legrand, 1871. *ibid.* sp. 22.
Helix (*Rhyssota*) *trajectura* Legrand, 1871. *ibid.* sp. 36.
Helix (*Microcystis*) *tranquilla* Legrand, 1871. *ibid.* sp. 37.
Helix (*Rhyssota*) *mixta* Legrand, 1871. *ibid.* sp. 38.
Helix (*Paryphanta*) *tabescens* Legrand, 1871. *Coll. Mon. Tas. Land shells* 2nd edition sp. 77.
Helix fordei m'coyi Petterd, 1879. *Mon. land shells Tas.*, 14.
Helix fernshawensis Petterd, 1879. *J. Conch.* 2, 355.
Thalassohelix translucens Gabriel, 1934. *Mem natn. Mus. Vict.* 8, 157.

Description: More or less turbinate shells, somewhat globose, with prominent almost acute apex, variably peripherally keeled, usually translucent horn to chestnut brown or greenish. Protoconch two whorls, radially closely lirate, spirally striate or decussate. Adult sculpture usually riblets to bold ribs with riblets or lirae between, irregular and variable on a variable wave-like surface producing a rugose effect. The ribs and riblets may be rounded or sharpened very fine or bold, the spire whorls sometimes with primary ribs clearly marked and spaced, the body whorl not normally thus clearly costately defined but usually with irregular ribs or riblets of variable strength. Microscopic spiral striae are sometimes visible crossing the radial ornament. The umbilicus is minute or partially covered, the aperture oblique lunate somewhat ovately-rounded. Morphs range from 4.0mm diameter at 4 to 5 whorls.

The reproductive tract (Plate 5A) has a large penis with the vas deferens opening terminally. There is no epiphallus though the proximal end of the vas deferens is enlarged close to its insertion into the penis. The vagina is short and the free oviduct long. The spermatheca has a long duct with the terminal sac wrapped around the albumen gland. The prostate glands in the dissected specimens were enlarged gelatinous masses; more material needs to be examined to determine whether this is a fixation artefact or is a subject for further investigation. The hermaphrodite duct was thickened and leads to the ovotestis which is composed of several lobes embedded in the digestive gland.

The radula (Plate 4A) is typically charopid with tricuspid central and lateral teeth and unicuspid lanceolate marginals. The central tooth is the same size as the laterals and both have long, narrow, pointed cusps with short pointed lateral cusps elevated above the central cusp. The lateral cusps of the lateral teeth remain equal across the radula. The transition between laterals and marginals involves three teeth. The marginals consist of a single long lanceolate cusp, equivalent to the mesocone of the laterals but almost twice the length of the lateral teeth. The marginals remain almost equal across the radula. The radula formula is 12-7-1-7-12 or 39 teeth per row. There is an obvious caudal pore and mucus gland present in the tail of this species.

Types: *Helix* (*Hemiplecta*) *fordei* Brazier, 1871, 3 syntypes AM C32845.
Helix fordei m'coyi Petterd, 1879, probably holotype Am C31160.
Thalassohelix translucens Gabriel, 1934, holotype NMV F618 and one paratype NMV F489.

The status and whereabouts of the types of the other species listed in the synonymy are unknown, presumed lost.

Type Locality: Mt. Wellington, Tasmania.

Distribution: Southern and western Tasmania (Smith and Kershaw, 1981) and south central Victoria (Smith and Kershaw, 1979) in wet forest.

Remarks: In accepting only one species as valid in the genus a conservative view is taken. Iredale (1937a) accepted three valid species, *H. fordei* Brazier, 1871 and *H. tranquilla* Legrand, 1871 from Tasmania, and *H. mccoysi* Petterd, 1879 from Victoria. A fourth species, *T. translucens* Gabriel, 1934, was included in the genus by Iredale (1937b). This group requires additional collections of live animals to facilitate a revision of the genus. Variation is seen in shell size and sculpture in different populations but critical collecting should elucidate this problem. The presence of a caudal pore and caudal mucus gland together with the absence of an epiphallus indicates a possible relationship with the Flammulinidae of New Zealand.

Stenacapha gen. nov.

Stenacapha Iredale, 1933. *Rec. Aust. Mus.* 19, 53 (*nomen nudum*).

Diagnosis: Shell medium to large, 5 to 6 whorls, spire flat to slightly convex, body whorl rounded. Umbilicus small, aperture widely ovate-lunate. Sculpture of fine radial ribs. Interstices reticulate, protoconch of radial and spiral lines. Colour yellow to pale reddish to brown. Penis large with a long cylindrical epiphallus almost as long as the penis, uterus short. Radula about 40 to 48 teeth per row, central the same size as the adjacent teeth, laterals tricuspid, marginals single, lanceolate.

Type Species: *Helix hamiltoni* Cox, 1868.

Remarks: The genus is characterised by a medium sized, thin, almost flat-spined shell with radial ribs and a yellow to yellow-brown colour suggesting the rhytidid appearance. But close inspection reveals reticulate interstices between the fine radial ribs. The radula is typically charopid in character (Solem, 1982) with tricuspid central and lateral teeth. It differs from all other Australian charopids by its large size and complex sculpture. Iredale (1933) mentioned comparisons to the New Zealand genera *Flammulina* and *Phacussa* but if these are correctly placed in the Flammulininae (Powell, 1979) the comparisons can be discounted. Members of this subfamily are described as having no epiphallus (Climo, 1969), whereas *Stenacapha* has a long cylindric epiphallus. The genus is common throughout Tasmania with populations showing a wide variation of size, form and colour. A detailed revision is required to elucidate the status of the various local forms.

Stenacapha hamiltoni (Cox, 1868)
(Plate 2B, Plate 3B)

- Helix hamiltoni* Cox, 1868. *Proc. Zool. Soc. Lond.* 1867, 722.
Helix (Videna) kingii Brazier, 1871. *Proc. Zool. Soc. Lond.* 1870, 662.
Helix (Patula) stephensi Legrand, 1871. *Coll. Mon. Tas. Land Shells* 1st edition, sp. 26.
Helix (Planispira) plexus Legrand, 1871. *ibid.* sp. 28.
Helix (Discus) coepta Legrand, 1871. *ibid.* sp. 41.
Helix (Videna) ducani Legrand, 1871. *ibid.* sp. 56.
Helix (Videna) pascoei Legrand, 1871. *Coll. Mon. Tas. Land shells* 2nd edition, sp. 65.
Helix (Videna) milligani Legrand, 1871. *ibid.* sp. 69.
Helix (Videna) floodi Legrand, 1871. *ibid.* sp. 70.
Helix (Charopa) irvinae Legrand, 1871. *ibid.* sp. 71.
Helix (Charopa) spoliata Legrand, 1871. *ibid.* sp. 75.
Helix (Charopa) scrupulus Legrand, 1871. *ibid.* sp. 76.
Helix (Rhytida) langleyana Brazier, 1875. *Proc. Linn. Soc. N.S.W.* 1, 18.
Helix wynyardensis Petterd, 1879. *Mon. Land shells Tas.*, 8.
Helix savesi Petterd, 1879. *ibid.* 12.

Description: Shell depressed sub-discoid to planate with last whorl rounded and expanded to sub-orbicular outline, normally dull translucent sometimes lustrous, spire whorls more or less flatly convex. Colour pale reddish brown or yellowish horn. Protoconch 1½ or 2 whorls, radially lirate with spiral striae variable or invisible. Adult spire whorls finely sculptured with primary riblets clear, sometimes spaced, interstices reticulate; last whorl sculpture approaching uniformity on an undulating surface with spirals sometimes very obvious. Umbilicus more or less small, ¼ diameter or less; the aperture oblique lunate-ovate with lip sometimes expanded and columella dilated. Morphs range from 3.25mm to 20mm at 4 to 5 whorls with records of 6 whorls. The reproductive tract (Plate 5B) has a large penis connected to the vas deferens by a long cylindrical epiphallus. The vagina is wide and the free oviduct short leading to a common duct. The spermathecal duct is long with the terminal sac over the albumen gland. The interior surface of the penis has a few wide, longitudinal folds of glandular tissue.

The radula (Plate 4B) is very similar to that of *Mulathena fordei* with the central tooth the same size as the lateral teeth, both being tricuspid with the central cusp long and narrow, the lateral cusps short, pointed and elevated above the central cusp. The marginals are long lanceolate teeth, all of a similar size. The radula formula is 13-7-1-7-13 or 41 teeth per row.

Types: *Helix hamiltoni* Cox, 1868. Holotype AM C100713; 4 paratypes AM C114258.

Helix (Videna) kingii Brazier, 1871, 2 syntypes AM C63662.

Helix (Patula) stephensi Legrand, 1871, probably holotype AM C63674.

Helix (Videna) ducani Legrand, 1871, 2 syntypes QVM type 148 1971/9/6; 25 syntypes AM C136897.

Helix (Videna) milligani Legrand, 1871, possible holotype AM C63693.

Helix (Rhytida) langleyana Brazier, 1875. holotype AM C63423.

Helix savesi Petterd, 1879, 2 possible syntypes AM C63422.

The status and the whereabouts of the types of the other species listed in the synonymy are unknown, presumed lost.

Type Locality: Mt. Wellington, Tasmania.

Distribution: Throughout mainland Tasmania and King Island, in woodland and forest (Smith and Kershaw, 1981).

Remarks: All the available names are here considered synonyms as from the descriptions and available type specimens, all could be considered to lie within one variable species. Large collections of live animals together with detailed anatomical studies are required to elucidate species boundaries and revise the genus. The species is common in litter in most forest and woodland habitats in Tasmania (Smith and Kershaw, 1981).

Thryasona gen. nov.

Thryasona Iredale, 1933. *Rec. Aust. Mus.* 19, 54 (*nomen nudum*).

Diagnosis: Shell medium, 4 to 5 whorls, spire flat to slightly convex, body whorl narrow, rounded. Umbilicus medium to wide, about one third of shell diameter, its margin obviously angled and descending steeply, aperture ovate-lunate. Sculpture of low to bold widely spaced ribs, interstices of riblets to reticulate, sometimes almost smooth, protoconch of fine radial lines to smooth. Colour horn to buff with faint reddish to brown streaks. Penis small with short epiphallic caecum, uterus large. hermaphrodite duct with thick muscular wall. Radula about 60-70 teeth per row, central very small, laterals tricuspid, marginals bicuspid.

Type Species: *Helix diemenensis* Cox, 1868.

Remarks: The genus is characterised by a medium sized shell with fairly tightly coiled whorls and complex sculpture of ribs with interstices of riblets or reticulate. Unlike *Mulathena* or *Stenacapha*, this genus has the appearance of a large "normal" charopid. The tricuspid central and lateral teeth confirm the placement and the presence of a small epiphallus and epiphallic caecum distances it from the New Zealand *Flammulina*. *Thryasona*'s relationship to the other Australian charopid genera must be determined by a full revision of the Australian Charopidae. Confirmation of the distribution of the genus should also await a modern revision. Smith and Kershaw (1979) doubted the extension of the genus into Victoria even though they followed Iredale in including *H. elesenescens* Cox and Hedley, 1912 in *Thryasona*.

Thryasona diemenensis (Cox, 1868)
(Plate 2C, Plate 3C)

Helix diemenensis Cox, 1868. *Proc. Zool. Soc. Lond.* 1867, 723.

Helix wellingtonensis Cox, 1868. *ibid.*, 723.

Helix (Discus) marchianae Legrand, 1871. *Coll. Mon. Tas. Land shells* 1st edition, sp. 25.

Helix (Discus) daveyensis Legrand, 1871. *ibid.* sp. 35.

Helix (Discus) fuscocoriata Legrand, 1871. *ibid.* sp. 61.

Helix (Discus) atkinsoni Legrand, 1871. *ibid.* sp. 62 (*nomen nudum*).

Helix (Charopa) thompsoni Legrand, 1871. *Coll. Mon. Tas. Land shells* 2nd edition, sp. 73.

Helix (Charopa) camillae Legrand, 1871. *ibid.* sp. 74.

Helix (Charopa) midsoni Legrand, 1871. *ibid.* (addendum slip).

Description: Depressed orbicular sub-discoid shells with spire slightly convex or planate, the whorls becoming loosely coiled with growth, dull glassy with radiating colour rays commonly present. Protoconch about two whorls more or less prominent, faintly radially lirate, sometimes with spiral striae or both, very variable and often apparently smooth. Adult sculpture somewhat irregular, close riblets with bolder ribs variably spaced and raised above remainder, all normally with somewhat sharpened crests. Spiral striae may cross the whole radial sculpture producing decussated sculpture in the interstitial spaces or may notch the riblets into a densely beaded effect. Umbilicus more or less wide $\frac{1}{4}$ to $\frac{1}{2}$ the diameter, always angled at the entrance and descending steeply within. Aperture more or less narrowly roundly lunate, slightly oblique and descending. The notched or beaded effect due to the variable spiral sculpture is a feature. The reproductive tract (Plate 5C) has a short penis connected to the vas deferens by a short epiphallus on which there is a short epiphallic caecum. The vagina is large and the free oviduct short leading to a fairly short common duct. The spermatheca arises at the top of the vagina as a wide medium to short duct. The hermaphrodite duct is enclosed in a thick muscular outer wall giving it the appearance of a strong wide curved tube. The ovotestis consists of two or three digitate glands.

The radula (Plate 4C) is typically charopid having tricuspid central and lateral teeth but differs in several respects from that of *Mulathena fordei* and *Stenacapha hamiltoni*. The central tooth is very small, only about a third of the size of the adjacent lateral teeth. The laterals have a long narrow central cusp and short elevated lateral cusps. Laterally from the central tooth the outer cusps become progressively smaller and the central and inside cusps progressively longer. There is a transition to the marginals which are bicuspid with two long narrow cusps, the outer cusp, formally the middle cusp of the laterals, is the larger. The size of the marginals slowly becomes smaller laterally. The radula formula is 21-8-1-8-21 or 59 teeth per row.

Types: *Helix diemenensis* Cox, 1868, holotype AM C100682.

The status and whereabouts of the types of the other species listed in the synonymy are unknown, presumed lost.

Type Locality: Mt. Wellington, Tasmania, designated by Iredale (1937a).

Distribution: All parts of mainland Tasmania, Flinders Island and some adjacent islands of eastern Bass Strait, woodland and forest (Smith and Kershaw, 1981).

Remarks: The names included in the synonymy of this species are placed there as the descriptions appear to fit within the expected variation of the species. Iredale (1937a) recognised four species of *Thryasona* in Tasmania. These were *H. diemenensis* Cox, 1868, and *H. marchianae* Legrand, 1871 from southern Tasmania, *H. daveyensis* Legrand, 1871 from the south west and *H. thompsoni* Legrand, 1871 from the islands of Bass Strait. But no reasons were given for this division and with no type specimens available, the impression is that his reasons were geographical.

The variation seen in populations from different parts of Tasmania could indicate separate species, but effective collections together with anatomical studies are required to elucidate the problem of population status.

DISCUSSION

The object of this study is to make the generic names *Mulathena*, *Stenacapha* and *Thryasona* validly available, as a preliminary to more detailed work on the Tasmanian charopid fauna. These names were used by Iredale (1933) for the groups recognised by the authors but they were not described in 1933 nor since then. The names were used in this work to preserve nomenclatural continuity, for although not technically available, they have been used over the years (Iredale, 1937a; Smith and Kershaw, 1979).

These three genera are easily separable on shell characters alone. All have medium to large shells for charopids. They range from 7mm to 20mm in diameter and show the complex primary and secondary sculpture elements of charopids. The radulae of *Mulathena* and *Stenacapha* are very similar in having 39 to 41 teeth per row with the central similar in size to the laterals and the marginals unicuspid, lanceolate. *Thryasona*, on the other hand, has about 59 teeth per row with the central much smaller than the laterals, and the marginals are bicuspid.

The reproductive anatomy shows differences between the three genera. *Mulathena* has no epiphallus. *Thryasona* has a small penis and epiphallus with an epiphallic caecum, and *Stenacapha* has a long, cylindrical epiphallus. *Thryasona* also has a hermaphrodite duct with a muscular sheath not seen in the other two genera.

With the presence of an obvious caudal pore and caudal mucus gland, not so readily noticed in the other genera, *Mulathena* has the best character cluster to indicate affinity with the New Zealand Flammulinae. Apart from this character, it has an elevated, turbinate shell with minute umbilicus and no epiphallus. Climo (1969) has reported on the presence of a caudal mucus gland and has redefined the Flammulinae on the basis of the absence of an epiphallus, but he only considered New Zealand species. Solem (1982) redefined the Charopidae to include these groups and stated that they are not amenable to subfamily distribution at this stage with which the authors agree.

Iredale (1937a) when listing the three genera described here in the family Flammulinidae on the basis of the presence of a caudal mucus gland, knew nothing of the significance of the epiphallus. Burch (1976) listed Iredale's three names in the subfamily Phenacohelicinae together with the following genera from Queensland and New South Wales:-

Hedleyoconcha Pilsbry, 1893 - type species *Helix delta* Pfeiffer, 1857.

Delinitesta Iredale, 1933 - type species *Helix (Thalassia) gayndahensis* Brazier, 1875.

Flammulops Iredale, 1937 - type species *Flammulina excelsior* Hedley, 1896.
Queridomus Iredale, 1937 - type species *Helix (Conulus?) grenvillei* Brazier, 1876.
Oreokera Iredale, 1941 - type species *Flammulina cumulus* Odhner, 1917.

The primary future need is the anatomical description of the Australian charopid fauna at specific and generic levels. This should bring our knowledge to the levels of the Pacific Islands and New Zealand faunas. Only then will a clear assessment of the higher taxa groupings be possible. When more wide-ranging studies have been made to describe the full range of variation within the Tasmanian and Australian charopid fauna it may become possible to make faunal comparisons.

Because of the rapid loss of the natural environment it is imperative that effective collections should be made from as many localities as possible.

ACKNOWLEDGEMENTS

Our thanks are due to Rhyll Plant for the illustrations, to Wendy Clark for the live *Mulathena* photograph, to Phil Bock, Royal Melbourne Institute of Technology and Phil Hollis, University of Melbourne for access and assistance with the Scanning Electron Microscope, to Frank Coffa and Rhyll Plant for assistance with photography, and Lyn Anderson for the typing of the manuscript. We are grateful to the Tasmanian and Australian Museums for making available material for the research which has now made this work possible. Acknowledgement is made to the Science and Industry Endowment Fund for one of us (R.C.K.) to support work on the land Mollusca, and to the Australian Biological Resources Study for support of one of us (B.J.S.) on work on Australian non-marine mollusc types.

REFERENCES

- Burch, J. B. 1976. Outline of classification of Australia terrestrial molluscs (native and introduced). *J. malac. Soc. Aust.* 3(3-4), 127-156.
- Climo, F. M. 1969. Classification of New Zealand Arionacea (Mollusca, Pulmonata). I. The higher classification. *Rec. Dom. Mus. Wellington* 6(12), 145-158.
- Iredale, T. 1933. Systematic notes on Australian land snails. *Rec. Aust. Mus.* 19, 37-59.
- Iredale, T. 1937a. A basic list of land Mollusca of Australia. *Aust. Zool.* 8(4), 287-333.
- Iredale, T. 1937b. A basic list of land Mollusca of Australia. Part II. *Aust. Zool.* 9(1), 1-39.
- Iredale, T. 1937c. An annotated checklist of the land Mollusca of South and Central Australia. *S. Aust. Nat.* 18, 6-56.
- Iredale, T. 1938. A basic list of land Mollusca of Australia. Part III. *Aust. Zool.* 9(2), 82-124.
- Iredale, T. 1939. A review of the land Mollusca of Western Australia. *J. R. Soc. West. Aust.* 25, 1-88.
- Kershaw, R. C. 1956. Studies on Australian Charopidae. Part III. *Victorian Nat.* 72(9), 137-143.
- Powell, A. W. B. 1979. *New Zealand Mollusca marine, land and freshwater*. 500 pp. Collins, Auckland.
- Smith, B. J. 1977. The non-marine mollusc fauna of the Otway region of Victoria. *Proc. R. Soc. Vict.* 89 (1 & 2), 147-155.
- Smith, B. J. and R. C. Kershaw 1979. *Field guide to the non-marine molluscs of south-eastern Australia*. 285 pp. ANU Press, Canberra.
- Smith, B. J. and R. C. Kershaw 1981. *Tasmania land and freshwater mollusc. Fauna of Tasmania Handbook No. 5*. 148 pp. University of Tasmania, Hobart.
- Solem, A. 1959. Systematics and zoogeography of the land and fresh-water Mollusca of the New Hebrides. *Fieldiana, Zool.* 43 (1), 1-359.
- Solem, A. 1964. *Amimopina*, an Australian enid land snail. *Veliger* 6 (3), 115-120.
- Solem, A. 1982. *Endodontoid land snails from Pacific Islands (Mollusca: Pulmonata: Sigmurethra). Part II. Families Punctidae and Charopidae*, Zoogeography. 336 pp. Field Museum Press, Chicago.

ABBREVIATIONS

Museums within which types are lodged:

AM	Australian Museum, Sydney
NMV	Division of Natural History, Museum of Victoria, Melbourne
QVM	Queen Victoria Museum, Launceston

Anatomical abbreviations:

E	epiphallus
EC	epiphallic caecum
G	ovotestis
GD	hermaphrodite duct
GG	albumen gland
P	penis
PR	penial retractor muscle
PU	fused prostate and uterus
S	spermatheca
UV	free oviduct
V	vagina
VD	vas deferens
Y	atrium



Plate 1.

Mulathena fordeii Brazier. Collected in wet forest 12km from Marysville on the Warburton Road, Victoria.

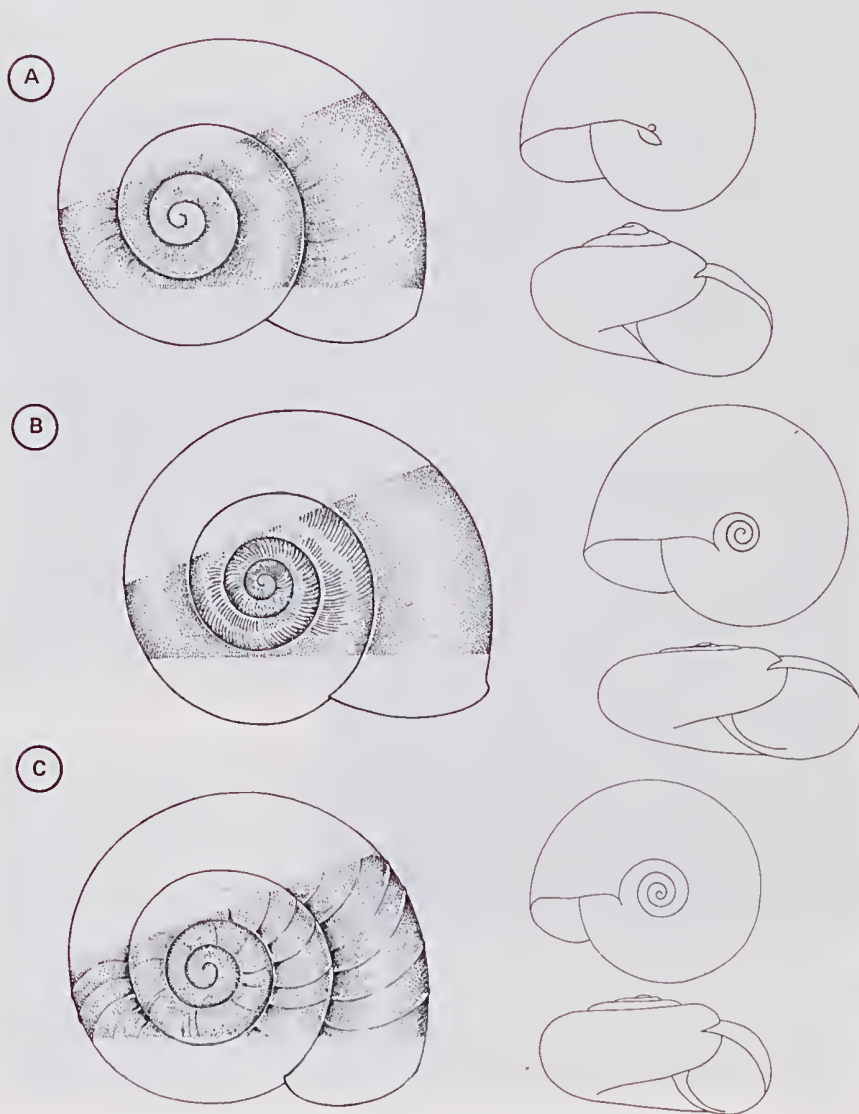


Plate 2.

A - *Mulathena fordei* shell.

B - *Stenacapha hamiltoni* shell.

C - *Thryasona diemenensis* shell.



Plate 3.

- A - *Mulathena fordei* micrograph of sculpture, specimen from Mt. Wellington, Tasmania (x 39).
B - *Stenacapha hamiltoni* micrograph of sculpture, specimen from southern Tasmania (x 17.5).
C - *Thryasona diemenensis* micrograph of sculpture, specimen from southern Tasmania (x 39).

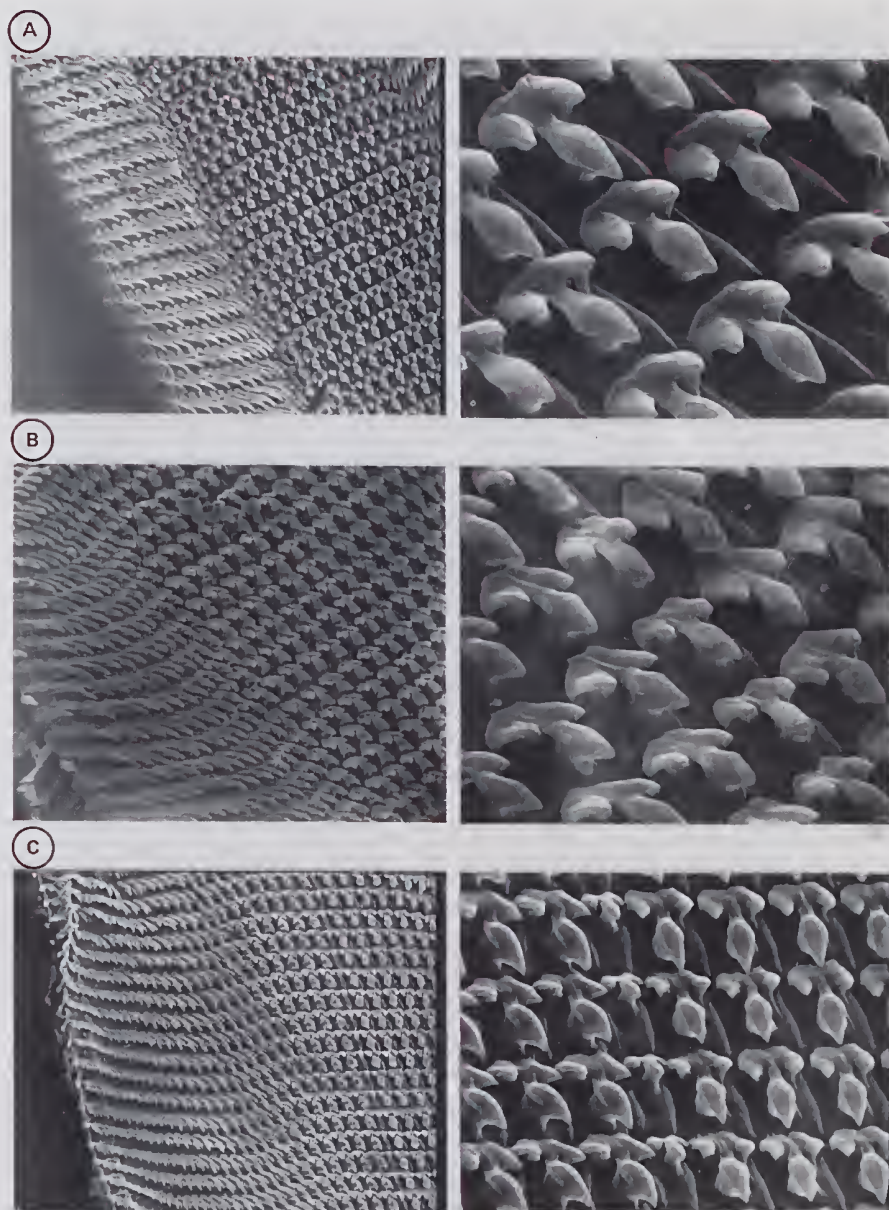


Plate 4.

- A - *Mulathena fordei* radula micrographs of half row and detail of central and lateral teeth structure, specimen from Louisa Bay, south west Tasmania (x 181 and x 1 170).
B - *Stenacapha hamiltoni* radula micrographs of half row and detail of central and lateral teeth, specimen from Latrobe, Tasmania (x 200 and x 800).
C - *Thryasona diemenensis* radula micrographs of half row and detail of central and lateral teeth, specimen from Cape Barren Island, Bass Strait, Tasmania (x 153 and x 670).

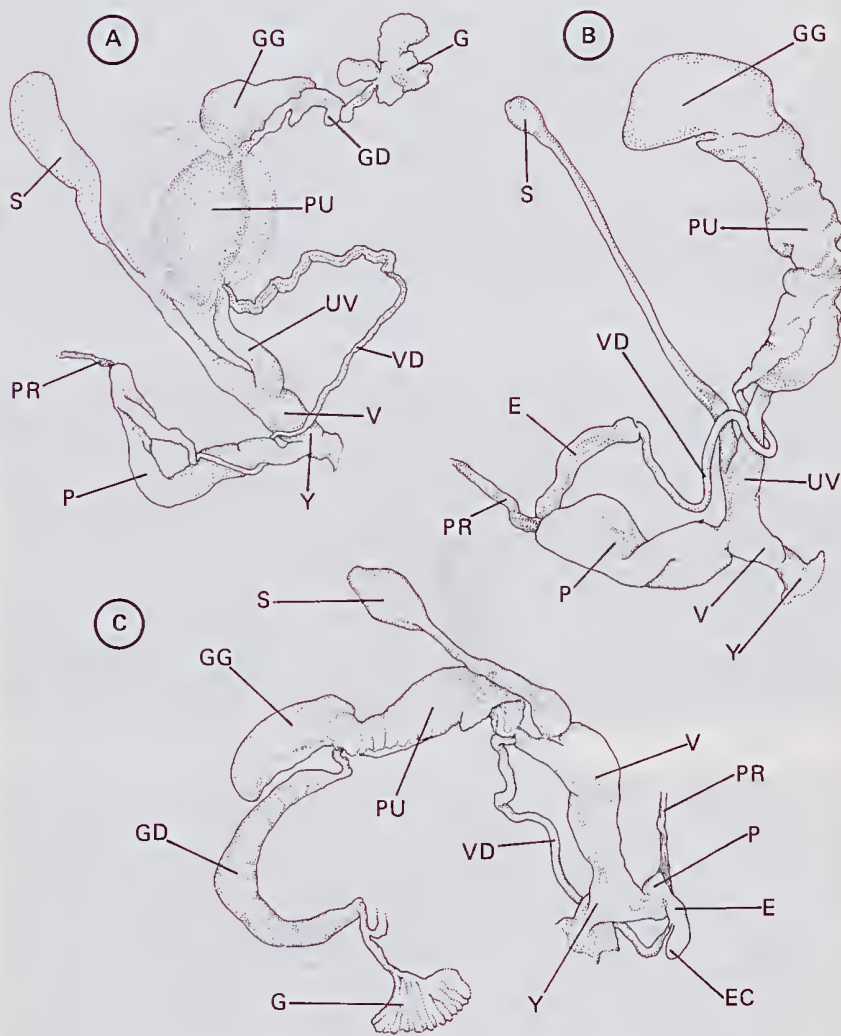


Plate 5.

A - *Mulathena fordei* reproductive tract, specimen from Mt. Oberon, Wilson's Promontory, Victoria.

B - *Stenacapha hamiltoni* reproductive tract, specimen from Latrobe, Tasmania.

C - *Thryasona diemenensis* reproductive tract, specimen from Green Hill Gully, Clarke Island, Bass Strait, Tasmania.

436
clipp